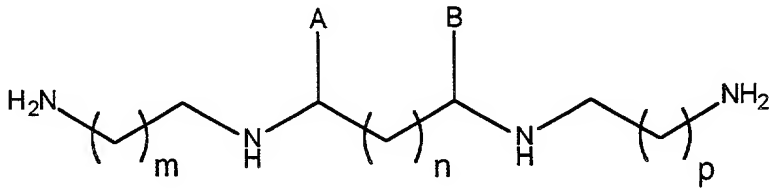
Claims

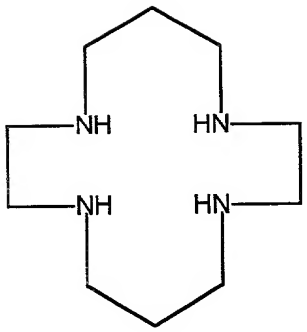
We claim;

1 A method of treating degenerative diseases due to
acquired mitochondrial DNA damage
redox damage to mitochondrial macromolecules
and inherited mitochondrial genetic defects
said method comprising the steps of: selecting a composition from a group consisting of open ring polyamines, macrocyclic polyamines, branched linear polyamines and substituted polyamines;
synthesizing said composition; and
administering an effective dose of said composition to a mammal.

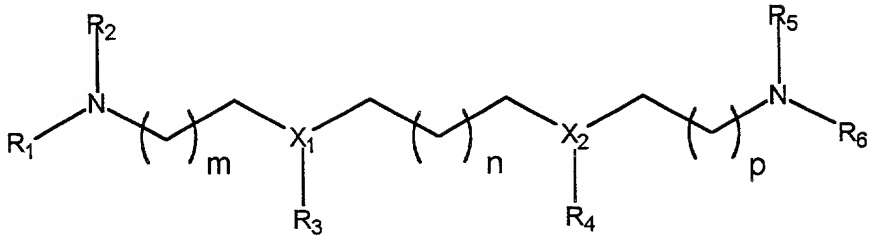
2 The method of Claim 1 wherein said step of synthesizing comprises converting by treatment with an alkyl halide a compound taken from a group consisting of those compounds having the formula



wherein A and B are hydrogen or alkyl, and m,n, and p are the same or different, and those compounds having the formula



3 The method of claim 2 wherein said composition is taken from a group consisting of those compositions having the formulae:



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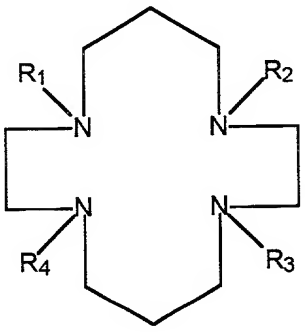

wherein:

R_1 and R_2 are taken from a group consisting of hydrogen, alkyl, aryl, cycloalkyl, amino acid, glutathione, uric acid, ascorbic acid, taurine, estrogen, dehydroepiandrosterone, probucol, vitamin E, hydroxytoluene, carvidilol, α-lipoic acid, α-tocopherol, ubiquinone, phylloquinone, β-carotene, meanadione, glutamate, succinate, acetyl-L-carnitine, co-enzyme Q, lazeroids, polyphenolic flavonoids, homocysteine, menaquinone, idebenone, dantrolene, $-(CH_2)_n[XCH_2)_n]NH_2$ - wherein n = 3-6 and R_1 and R_2 taken together are $-(CH_2XCH_2)_n-$ wherein n = 3-6,

R_3 and R_4 are taken from a group consisting of hydrogen, alkyl, aryl, cycloalkyl, amino acid, glutathione, uric acid, ascorbic acid, taurine, estrogen, dehydroepiandrosterone, probucol, vitamin E, hydroxytoluene, carvidilol, α-lipoic acid, α-tocopherol, ubiquinone, phylloquinone, β-carotene, meanadione, glutamate, succinate, acetyl-L-carnitine, co-enzyme Q, lazeroids, polyphenolic flavonoids, homocysteine , menaquinone, idebenone, dantrolene or heterocycle and R_3 and R_4 taken together are $-(CH_2XCH_2)_n-$ wherein n = 3-6,

R_5 and R_6 are taken from a group consisting of hydrogen, alkyl, aryl, cycloalkyl, amino acid, glutathione, uric acid, ascorbic acid, taurine, estrogen, dehydroepiandrosterone, probucol, vitamin E, hydroxytoluene, carvidilol, α-lipoic acid, α-tocopherol, ubiquinone, phylloquinone, β-carotene, meanadione, glutamate, succinate, acetyl-L-carnitine, co-enzyme Q, lazeroids, polyphenolic flavonoids, homocysteine, menaquinone, idebenone, dantrolene $-(CH_2)_n[XCH_2)_n]NH_2$ - wherein n = 3-6, and R_5 and R_6 taken together are $-(CH_2XCH_2)_n-$ wherein n = 3-6.

M, n, and p may be the same or different and are bridging groups of variable length from 3-12 carbons, and

X is taken from a group consisting of nitrogen, sulfur, phosporous and carbon.

4 The method of Claim one wherein said step of synthesizing further comprises the steps of:

-admixing an element taken from a group consisting of 2,4 dibromopropane and absolute ethanol into 1,2-diaminoethane hydrate;

-heating the resulting mixture to approximately 50^0C for about one hour;

-adding potassium chloride;

-continuing said heating for three hours;

-filtering potassium bromide out of the mixture;

-distilling the mixture at reduced pressure;

-allowing the formation of top and bottom layers;

-separating and distilling the top layer;

-converting free amine in the distilled top layer to a tetrahydrochloride salt; and

-converting said salt to a free amine by treatment with ammonium hydroxide.

5 The method of claim 4 wherein said step of converting to a tetrahydrochloride salt comprises adding hydrochloric acid to said distilled top layer.

6 The method of Claim 4 wherein said composition consists of 1,3-bis-[(2'-aminoethyl)-amino]propane and step of admixing a solution comprises preparing said solution by mixing 1,3-dibromopropane and absolute ethanol in a ratio of approximately 1 to 3 per weight.

7 The method of Claim 6 wherein said step of admixing further comprises slowly adding said solution into 1,2-diaminoethane hydrate in a ratio of approximately 2.6 to 1 per weight.

8 The method of claim 7 wherein, the step of preparing said solution comprises mixing 15 grams of 1,3-diaminopropane and 50 milliliters of absolute ethanol; and

the step of slowly adding comprises adding said solution to 20 grams of potassium chloride;

9 The method of Claim 8 wherein said step of converting to a tetrahydrochloride salt comprises adding six molar concentration of hydrochloric acid.

10 The method of claim 2 wherein said step of selecting comprises:

ascertaining the heats of formation of a set of said compounds; and choosing said compound in consideration of its heat of formation compared to the heats of formation of other compounds in said set.

11 The method of claim 10 wherein: said step of ascertaining comprises: calculating the heats at the formation of said set of compounds from their respective constituent atoms.

12 The method of claim 11 wherein said step of choosing comprises determining the stabilities of said set of compounds as a function of their respective heats of formation;

wherein said stabilities are determined in inverse proportion to said respective heats of formation; and

whereby the relative stabilities of the set of compounds are deemed indicative of ability to yield the most stable complex when reacted with a group of metals.

13 The method of Claim 12 wherein;

said group of metals includes copper, cobalt, iron, zinc, cadmium, manganese and chromium.

14 The method of Claim 13 wherein said degenerative diseases comprise neurodegenerative diseases characterized by excess iron pools and said compound is selected from a group consisting of 2,2,2-piperidine and 2,3,2 adamantane.

15 The method of Claim 13 wherein said degenerative diseases comprise ischemic damage and pump failure post myocardial infarction characterized by iron-induced toxic redox effects and depletion of tissue zinc stores; and said compound is selected from a group consisting of zinc cyclam methylated, zinc cyclam adamantane, cyclam methylated and cyclam adamantane.

16 The method of Claim 13 wherein said degenerative diseases comprise neurodegenerative diseases and strokes; and said composition is selected from a group consisting of compositions having open ring metal binding molecules taken from a group consisting of compositions having copper binding molecules and manganese binding molecules.

17 The method of Claim 16 wherein said compositions having copper-binding molecules include 2,3,2 isopropyl on N1/N4; and
said compositions having manganese-binding molecules include 3,3,3 tetramine.

18 The method of claim 13 wherein said degenerative diseases comprise neurodegenerative disorders, stroke, glaucoma, atherosclerosis, cardiomyopathy, ischemia, optic neuropathy, peripheral neuropathy, presbycussis and cancer; and said composition is selected from derivatives of those compounds having the largest ring molecules.

19 The method of claim 18 wherein said compounds having the largest ring molecules includes 3,3,3 tetramine, cyclam adamantanes, cyclam 3,3,3 and compounds having alkyl substituted molecules.

20 The method of Claim 13 wherein said degenerative diseases comprise Parkinson's, Lou Gehrig's, Binswanger's, and Lewy Body diseases, Olivopontine Cerebellar Degeneration, stroke, glaucoma and optic neuropathy; and
said composition is selected from a group of compositions having alkyl side chains.

21 The method of Claim 13 wherein said degenerative diseases comprise neurodegenerative diseases, ischemia post myocardial infarction and atherosclerosis; and
said composition is selected from derivatives of compounds from a group consisting of piperidine, piperazine and adamantane.

22 The method of claim 3 wherein said degenerative diseases comprise stroke, diabetic neuropathy, peripheral neuropathy, Alzheimer's disease, atherosclerosis, ischemia, diabetes, presbycussis, cardiomyopathy and congestive heart failure; and said composition is derived from compounds having terminal nitrogen added molecule substitution with elements selected from a group consisting of glutathione, uric acid, ascorbic acid, taurine, estrogen, dehydroepiandrosterone, probucol, vitamin E, hydroxytoluene, carvidilol, α lipoic acid, tocopherols, ubiquinone, phylloquinone, carotenes, menadione, glutamate, succinate, acetyl-l-carnitine, co-enzyme Q, lazeroids, polyphenolic flavonoids, homocysteine, menaquinone, idebenone, dantrolene and phosporous.

23 The method of Claim 22 wherein said degenerative disease comprises stroke; and said composition consists of uric acid polyamine.

24 The method of Claim 22 wherein said degenerative disease comprises diabetes; and said composition is derived from compounds selected from a group consisting of phosphorous, taurine, CoEnzyme Q, α lipoic acid, tocopherol, succinate, glutamate and acetyl-l-carnitine polyamines.

25 The method of Claim 22 wherein said degenerative disease comprises Alzheimer's disease and presbycussis; and
said composition is derived from compounds selected from a group consisting of α lipoic acid and acetyl-l-carnitine polyamines.

26 The method of Claim 22 wherein said degenerative disease comprises atherosclerosis; and said composition selected from a group consisting of tocopherol polyamine and coenzyme Q polyamine.

27 The method of Claim 22 wherein said degenerative disease comprises ischemia;
and
said composition is selected from a group consisting of tocopherol polyamine and coenzyme Q polyamine.

28 The method of Claim 22 wherein said diseases comprise myocardial degeneration and congestive heart failure; and said composition consists of coenzyme Q polyamine.

29. The method of Claim 22 wherein said degenerative diseases comprise cancer; and said composition is taken from a group consisting of cobalt di-homocysteine polyamines.

30 The method of Claim 2 wherein said step of converting comprises adjusting the in vivo half life and pharmacokinetic properties of said composition by selective terminal nitrogen substitutions.

31 The method of Claim 2 wherein said step of converting comprises adjusting the in vivo half life and pharmacokinetic properties of said composition by addition of side chains on amino or methylene groups.

32 The method of Claim 2 wherein said step of selecting comprises:
finding the octanol / water coefficients of partition of a series of said compounds; and
picking said compound in consideration of its octanol / water coefficient compared to the octanol water coefficients of other compounds in said series.

33 The method of Claim 32 wherein said step of picking comprises determining the abilities of said series of compounds to pass through the intestinal, blood brain and blood retinal barriers as a function of their respective octanol / water coefficients; wherein said abilities are determined according to a distribution curve centered about 2 and having a useful range extending towards 0.5 and 4, the numbers being log values.

34 The method of Claim 2 wherein said step of selecting comprises;

34 The method of Claim 2 wherein said step of selecting comprises;
measuring pKas of a list of said compounds; and
selecting said compound in consideration of its pKas compared to the pKa's of other compounds on the list.

35 The method of Claim 34 wherein said step of selecting comprises;
selecting a composition with higher pKas in the treatment a disease characterized by lower tissue pH.

36 The method of Claim 35 wherein said diseases include ischemia post myocardial infarction and diabetic ketoacidosis.

37 The method of Claim 2 wherein said step of selecting comprises determining the respective likely efficiency of said compounds in consideration of the disease target to be treated and the route of administration.

38 The method of Claim 20 wherein;
said compound consisting of pyridine tetramine.

39 The method of Claim 20 wherein said degenerative disease consists of Alzheimer's disease; and
said compound comprises acetyl-l-carnitine polyamine.

40 The method of Claim 22 wherein said degenerative disease consists of diabetes; and

said compounds are selected from a group consisting of 2,3,2 piperidine, glutamate polyamine, succinate polyamine, chromium tetramine and vanadyl tetramine and phosphorous polyamine.

41 The method of Claim 2 wherein said degenerative diseases comprise peripheral and optic neuropathy; and

said compounds comprise taurine polyamine and α lipoic acid polyamines.

42 The method of Claim 2 wherein said degenerative diseases comprise glaucoma; and said compounds comprise adamantane 2,3,2 tetramine and adamantane cyclam.

43 The method of Claim 3 wherein said degenerative disease comprise presbycussis; and said compounds comprise α lipoic acid polyamine and acetyl-l-carnitine polyamine.

44 The method of Claim 4 wherein said composition consists of (2-aminoethyl){3-[(2-aminoethyl)amino]-1-methylbutyl}amine; and said step of admixing a solution comprises preparing said solution by mixing 2,4 dibromopropane and absolute ethanol in a ratio of approximately 1 to 20 per weight.

45 The method of claim 44 wherein said step of admixing comprises slowly adding said solution into 1,2-diaminoethane hydrate in a ratio of approximately 44 to 1 per weight.

46 The method of claim 45 wherein said step of converting to a tetrahydrochloride salt comprises of adding hydrochloric acid.

47 The method of Claim 2 wherein said composition consists of (2-aminoethyl){3-[(2-aminoethyl)amino]-1-methylbutyl}amine; and

said step of synthesizing further comprises; the steps of

-admixing a solution of an element, taken from a group consisting of 1,3-diaminopropane and N,N-dimethyl-1,3-propanediamine and ethanol into 2-chloromethylpiperidine in water;

-adjusting the pH of the resulting mixture to 9 by addition of 10% sodium hydroxide;

-stirring the mixture at room temperature and maintaining the pH between 8 and 9 by addition of sodium hydroxide over 3 days;

-allowing solvents to evaporate; and

-extracting residues with CH_2Cl_2.

48 The method of Claim 47 wherein said step of admixing a solution further comprises adding said solution into chloromethyl pyridine in water in a ratio of approximately 5 to 3 per weight wherein said chloromethylpyridine is diluted into water in a ratio of approximately 1 to 5 per weight.

49 The method of claim 48 wherein said step of admixing a solution comprises preparing said solution in a ratio of approximately 1 to 50 per weight.

50 The method of Claim 49 wherein said steps of synthesizing comprises synthesizing (2-pyridylmethyl){3-[(2-pyridylmethyl)amino]propyl}amine; and

said step of admixing a solution further comprises preparing said solution by mixing 1,3-diaminopropane in water with ethanol.

51 The method of claim 50 when said step of synthesizing further comprises synthesizing methyl(3-[methyl(2-pyridylmethyl)amino]propyl}(2-pyridylmethyl)amine; and said step of admixing a solution further comprises preparing said solution by mixing N,N-dimethyl-1,3 propanediamine in water with ethanol.

52 The method of claim 2 wherein said step of synthesizing comprises the steps of a preparation by adding a first solution of 1,3 diaminopropane and absolute ethanol dropwise into a second solution of ethanol and an element taken from a group consisting of 1-(2chloroethyl)piperidine and 1-(2-chloroethylpiperizine) and admixing over approximately 30 minutes;

stirring said preparation over approximately 24 hours;

evaporating the solvents in said preparation;

extracting the residue using a volume of CH_2Cl_2 dried over Na_2SO_4 and evaporated to dryness;

purifying the resulting composition by converting to its hydrochloride salt by adding hydrochloric acid; and

converting said salt to its free amine by treatment with NH_4OH.

53 The method of claim 52 wherein said step of mixing a preparation comprises forming said first solution of 1,3 diaminopropane and ethanol in a ratio of approximately 1 to 100 per weight and adding said first solution into said second solution in a ratio of approximately 1 to 1 by weight.

54 The method of Claim 2 wherein said composition consists of [2-(methylethylamino)ethyl](3-{[2-(methylamino)ethyl]amino}propyl)amine; and said step of synthesizing further comprises; preparing of first mixture of magnesium turnings, 1,3-bis-[(2'-aminoethyl)-amino]propane, benzene and acetyl chloride respective approximate percentage of 0.6%, 8.5%, 8.45%, and 6.4% per weight;

cooling said first mixture;

separating the mixture into a liquid phase and a solid phase;

preparing a second mixture by mixing said solid phase with ether;

preparing a solution by pouring said second mixture over ice;

preparing a third mixture by adding said solution to said liquid phase;

washing said third mixture with sodium bicarbonate;

washing said third mixture with water.

55 The method of Claim 2 wherein said step of synthesizing comprises converting the starting di – or tetramine component, at least one of said components in said compounds to the corresponding N-substituted compound by treatment with an alkyl halide; and

purifying said composition by conversion to a salt through addition of hydrochloric acid.

56 The method of Claim 2 wherein said composition consists of (2-aminoethyl){3-[(2-aminoethyl)methylamino]propyl}methylamine, and

said step of synthesizing further comprises:

preparing a first solution of N,N-dimethyl-1,3-propanediamine and ethanol in a ratio of approximately 1 to 50 per weight;

preparing a second solution of 2-chloroethylamine and ethanol in a ratio of approximately 1 to 17 per weight;

combining said first and second solutions into a third solution;

stirring said third solution at room temperature for approximately 20 hours;

evaporating solvents in said third solution; and

extracting residues in said solution with a volume of CH_2Cl_2.

57 The method of Claim 2 wherein said composition consists of [2-(bicyclo[3.3.1]non-3-ylamino)ethyl](3-{2-(bicyclo[3.3.1]non-3-ylamino)ethyl]amino}propyl)amine, and said step of synthesizing further comprises heating for approximately 6 hours at 215^0C a mixture of 1-bromoadamantane and 2,3,2-tetramine in a mol ratio of approximately 1 to 5;

admixing said mixture into a solution of 2NHCl and ether having a ratio of approximately 1.25 to 1 per weight, in a ratio of approximately 1 to 9 per weight;

separating the aqueous layer and alkalinizing said layer in a volume of 50% aqueous NaOH;

extracting with ether;

drying the extract over K_2CO_3; and

evaporating to an oil.

58 The method of Claim 2 wherein said composition consists of [2-(methylethylamino)ethyl](3 {[2-(methylamino)ethyl]amino}propyl)amine; and

said methylating step of synthesizing further comprises;

methylating terminal nitrogens of 2,3,2 tetramine by refluxing in the presence of benzene and acetyl chloride.

59 The method of Claim 58 wherein said step of synthesizing further comprises;

preparing a first mixture of magnesium turnings;

of 1,3-bis-[(2'-aminoethyl)-amino]propane, benzene and acetyl chloride respective approximate percentage of 0.6%, 8.5%, 8.45%, and 6.4% per weight;

cooling said first mixture;

separating the mixture into a liquid phase and a solid phase;

preparing a second mixture by mixing said solid phase with ether;

preparing a solution by pouring said second mixture over ice;

preparing a third mixture by adding said solution to said liquid phase;

washing said third mixture with sodium bicarbonate;

washing said third mixture with water;

drying said third mixture over $CaCl_2$;

filtering said third mixture;

preparing a fourth mixture of said third mixture sodium hydride and N,N,-dimethylformamide in a ratio of approximately 2.5, 1 and 37.5 respectively per weight;

heating said fourth mixture under N_2 at approximately 60^0C for about three hours;

treating said fourth mixture with approximately ¼ its volume of iodomethane;

stirring said treated fourth mixture at 50^0C for approximately 24 hours;

quenching said treated fourth mixture with 95% ethanol;

removing volatiles at reduced pressure;

watering with addition of approximately ½ volume of water;

extracting organic products with approximately three ½ volumes of chloroform;

washing said organic products with water and NaCl;

drying said organic products over anhydrous sodium sulfate;

concentrating into an oil;

purifying said oil by flash chromatography with ¼ hexanes-ethyl acetate as eluent into an acetylated oil of said composition;

forming a solution of said acetylated oil, potassium hydroxide, methanol and water in respective proportions of 1, 3, 23 and 5 per weight respectively;

heating said solution under reflux for about 24 hours;

removing methanol at reduced pressure;

extracting into ether;

washing with NaCl;

drying over sodium sulfate;

concentrating under vacuum;

purifying by flash chromatography; and

evaporating solvents.

60 The method of Claim 2 wherein said composition consists of [2-(dimethylamino)ethyl](3-{[2-(dimethylamino)ethyl]methylamino}propyl)methylamine; and

said steps of synthesizing further comprises;

refluxing for about 20 hours a solution of 2,3,2 tetramine, formic acid and 37% formaldehyde and water in a weight proportions of approximately 1,10,10 and 1 respectively;

evaporating solvents from said solution;

making said solution basic by addition of NaOH; and

extracting residues with 3 times $1^1/_2$ volume of CH_2Cl_2.

61 The method of Claim 2 wherein said composition consists of 2-[3-(2-aminoethylthio)propylthio]ethylamine; and

said step of synthesizing further comprises:

preparing a first solution of 1,3-dimercaptopropane and water in a weight ration of about 1 to 50;

preparing a second solution of NaOH and water in a weight ratio of about 1.5 to 10;

forming a first mixture by mixing said first and second solutions in a weight ratio of about 5 to 1;

forming a third solution of 2-chloroethylamine and ethanol in a weight ratio of about 8.5 to 1;

admixing said solution into said mixture in a ratio of about 1 to 3.8;

refluxing said mixture over approximately 8 hours;

evaporating solvents from said refluxed mixture;

extracting residues with CH_2Cl_2.

62 The method of Claim 2 wherein said composition consists of:

1,4,8,11-tetraaza-1,4,8,11-tetramethylcyclotetradecane; and

said steps of synthesizing comprises:

refluxing for about 18 hours a solution of cyclam, formic acid, 37% formaldehyde and water in weight proportions of approximately 1, 5.3, 4.5 and 1 respectively;

adding water to said solution in a weight ratio of approximately 0.5 to 1;

cooling said solution to about 5^0C;

adjust the pH of said solution to above 12 with NaOH;

extracting the solution with CH_2Cl_2;

63 The method of Claim 2 wherein said composition consists of 1,4,8,11-tetraaza-1,4,8,11-tetra(2-piperidylethyl)cyclotetradecane; and said step of synthesizing further comprises:

preparing a first solution of cyclam and CH_2Cl_2 in a weight ratio of approximately 1 to 50;

preparing a second solution of NaOH and water in a weight ratio of approximately 1 to 31;

preparing a mixture of said first and second solution in a weight ratio of approximately 1 to 1;

preparing a third solution of 1-(2-chloroethyl)piperidine and CH_2Cl_2 in a weight ratio of approximately 1 to 14;

adding said third solution dropwise into said mixture in a weight ratio of about 1 to 2;

stirring said mixture over about 24 hours;

evaporating solvents; and

extracting residues with CH_2Cl_2.

64 The method of Claim 2 wherein said composition consists of 1,4,8,11-tetraaza-1,4,8,11 - tetrabicyclo[3.3.1]non-3-ylcyclotetradecane; and

said step of synthesizing further comprises:

forming a first solution of cyclam and ethanol in a weight ratio of approximately 1 to 100;

forming a second solution of 1-bromoadamantane and ethanol in a weight ratio of 1 to 23;

forming a mixture by adding said second solution dropwise into said first solution in a weight ratio of about 1 to 1, over 30 minutes;

heating said mixture to reflux over about 20 hours;

evaporating said solution under reduced pressure; and

extracting residue from said solution with CH_2Cl_2;

65 The method of Claim 2 wherein said composition consists of

1,4,8,11-tetraaza-1,4,8,11-tetraethylcyclotetradecane; and

said step of synthesizing further comprises:

forming a solution of cyclam and DMF in a weight ratio of approximately 1 to 50;

admixing under stirring small portions of NaH in a weight ratio of about 1 to 12.5;

heating said solution for about three hours at about 60^0C;

admixing iodoethane in a single portion into said solution in a weight ratio of about 1 to 17.5;

heating said solution at about 60^0C over about 18 hours;

quenching the solution with about 95% ethanol;

extracting residue with CH_2Cl_2.

66 The method of Claim 2 wherein said composition consists of N,N'-(2' dimethylphosphinoethyl)-propylenediamine; and the step of synthesizing further comprises:

incorporating phosphorus into a molecule of propylenediamine in place of two of its nitrogen atoms by addition and reduction reactions.

67 The method of Claim 66 wherein said step of incorporating comprises:

preparing a first solution by dissolving propylenediamine into ethanol in a weight ratio of about 1 to 50;

admixing dimethylvinylphosphine sulfide into said solution in a weight ratio of about 1 to 22;

heating at reflux said solution for about 72 hours;

evaporating solvents under reduced pressure, leaving a residue.

68 The method of Claim 67 wherein said step of incorporating further comprises:

dissolving said residue in chloroform;

washing said residue with NaOH; and

drying said residue over $MgSO_4$.

69 The method of Claim 68 wherein said step of synthesizing further comprises:

removing solvents in said residue under reduced pressure to yield an oil,

crystallizing said oil with ethyl acetate;

preparing a suspension of $LiAlH_4$ in dry dioxane in a weight ratio of about 1 to 100;

admixing said oil into said suspension;

to yield a mixture;

refluxing said mixture for about 36 hours;

cooling said mixture; and

adding a solution of dioxane in water and NaOH into said mixture.

70 The method of Claim 2 wherein said diseases consist of diabetes and abnormal low density lipoprotein (LDL) to high density lipoprotein (HDL) ratio and said composition is selected from a group consisting of vanadyl 2,3,2-tetramine and chromium 2,3,2-tetramine; and said step of synthesizing further comprises reacting a metallic salt with 2,3,2-tetramine in an ethanol solution.

71 The method of Claim 70 wherein said step of reacting comprises:

forming a first solution of 2,3,2 tetramine in ethanol in a weight ratio of about 1 to 20;

forming a second solution of vanadyl acetylacetonate in ethanol in a weight ratio of about 1 to 275;

admixing said second solution into said first solution in a volume ratio of about 1 to 1; and

refluxing said solution for almost 30 minutes.

72 The method of Claim 70 wherein said step of reacting further comprises:

preparing a first solution of 2,3,2-tetramine in ethanol in a weight ratio of about 1 to 20;

preparing a second solution of chromium (III) nitrate in ethanol in a weight ratio of about 1 to 80;

admixing said second solution into said first solution in a volume ratio of about 1 to 1; and

refluxing said solution for about 30 minutes.

73 The method of Claim 55 wherein said step of converting comprises using amines to attach alkyl halide in a nucleophilic substitution of N atoms.